# Identifying Effects Of Mercury And Selenium On Sacramento Splittail And Striped Bass : An Integrated “Trophic” Approach

**Swee Joo Teh**

## Public Comments

No public comments were received for this proposal.

# Collaboration Panel Review

## Proposal Title

#0168: Identifying Effects Of Mercury And Selenium On Sacramento Splittail And Striped Bass : An Integrated “Trophic” Approach

| Final Panel Rating |
| --- |
| inadequate |

## Collaboration Panel (Primary) Review

### Collaboration:

Will the results of the collaborative effort be greater than the sum of its parts? Is it clear why the subprojects are part of a larger collaborative proposal rather than several independent smaller ones?

**This $846K proposal is investigates mercury and selenium effects on striped bass and splittail. This project has been mis-classified as a collaboration. There are two letters expressing interest in collaborating, but the team from Norway does not have any CVs, no budget and no description of specific tasks.**

### Interdependence And Integration:

Does the proposal have an example that clearly articulates the conceptual model of each subproject and how they link together as a whole? Are the boundaries of the study plans focused and cohesive, yet well delineated? Is there a plan for potential differences in the stages of subproject completion times? Are there clear plans for analyses and interpretations which seek to identify and quantify relationships among the data collected in various subprojects rather than separate analyses for each subproject?

**The project contains a good mix of integrated tasks.**

## Project Management:

Is it clear who will be performing management tasks and administration of the project? Are there resources set aside for project management and time given for investigators to collaborate? Is there a process for making decisions during the course of the project? Are there acknowledgments of potential barriers to collaboration and explanations of how team members will overcome barriers particular to their institutions?

**There is very little discussion of project management.**

## Team Composition:

Does the lead principal investigator have successful management history and experience leading collaborative teams? Is it clear that all key personnel are committed to making significant contributions to the project? Do team members have complementary skills?

**The PI has experience in managing large teams.**

## Communication Of Results:

Is there a clear plan for comprehensive and cohesive reporting of project progress to the CALFED community?

**The normal mix of papers and talks is included**

## Additional Comments:

# Collaboration Panel (Discussion) Review

**Primary reviewer noted that most of the collaboration was occurring within one lab at UCD. One team in Norway is mentioned and seems to acknowledge participation, but only by letter. Reviewer judged that the proposal did not describe a true collaboration. Secondary reviewer felt that different**

**departments working together within one academic organization should be considered collaboration; after a prolonged discussion, the panel decided that collaboration, as defined by the PSP, was between institutions. Subsequently, the proposal was rated as inadequate.**

# Technical Synthesis Panel Review

## Proposal Title

#0168: Identifying Effects Of Mercury And Selenium On Sacramento Splittail And Striped Bass : An Integrated “Trophic” Approach

| Final Panel Rating |
| --- |
| **adequate** |

## Technical Synthesis Panel (Primary) Review

### TSP Primary Reviewer's Evaluation Summary And Rating:

**The researchers propose to study the effects of Hg and Se on a benthivore (splittail) and piscivore (striped bass) in the Bay−Delta. They will conduct feeding studies on larval fish and assess growth rates, biochemical and histiopathologic biomarkers. The proposal addresses an important issue in the Bay−Delta, the effects of both Hg and Se, both known contaminants in the system. While the researchers present a strong case for studying these contaminants both separately and combined, there is no real sense of how this proposed work supplements their ongoing work and which efforts in this proposal are new. The approaches are fairly standard toxicological techniques in a sense, the work appears to be one which has been done for other species and the researchers have simply plugged in splittail and striped bass for the study. The proposal is somewhat sloppy as there is a reference on page 7 to analyzing clams, even though they are not part of this study. The reference to an integrated trophic approach in the title of this proposal is only supported by the fact that one specie is a piscivore and the other a benthivore. While striped bass may prey on splittail, this study is designed for larval fish and at this stage, both feed on zooplankton. It is difficult to assess how this will be applied to the field or for management concerns.**

## Additional Comments:

**PI’s need to show how this study relates to others submitted by the various toxicology groups from this institution. There appears to be overlap in work being currently proposed and that currently funded by CALFED, yet there is no integration in this proposal.**

**The researchers propose to study the effects of Hg and Se on a benthivore (splittail) and piscivore (striped bass) in the Bay−Delta. They will conduct feeding studies on larval fish and assess growth rates, biochemical and histiopathologic biomarkers. The proposal addresses an important issue in the Bay−Delta, the effects of both Hg and Se, both known contaminants in the system. While the researchers present a strong case for studying these contaminants both separately and combined, there is no real sense of how this proposed work supplements their ongoing work and which efforts in this proposal are new. The approaches are fairly standard toxicological techniques in a sense, the work appears to be one which has been done for other species and the researchers have simply plugged in splittail and striped bass for the study. The proposal is somewhat sloppy as there is a reference on page 7 to analyzing clams, even though they are not part of this study. The reference to an integrated trophic approach in the title of this proposal is only supported by the fact that one specie is a piscivore and the other a benthivore. While striped bass may prey on splittail, this study is designed for larval fish and at this stage, both feed on zooplankton. It is difficult to assess how this will be applied to the field or for management concerns.**

# Technical Synthesis Panel (Discussion) Review

## TSP Observations, Findings And Recommendations:

**Identifying Effects of Mercury and Selenium on Sacramento Splittail and Striped Bass: An Integrated “Trophic” Approach**

**The proposed research was insufficiently innovative; instead, a routine approach was proposed that has been followed in past research and in others submitted to CALFED in this call for proposals. Dose−response work would be useful for management decisions, however. The panel felt that the choice of striped bass and splittail larvae as representative species and stages in the foodweb trophic interactions received no justification. The panel found this choice confusing.**

**The prose of the proposal was error ridden, and reviewers worried that this would translate into poorly written publications.**

**The panel had questions about the dual total Hg, inorganic Hg analyses used to calculate MeHg. The PIs should measure MeHg directly, since these calculations do not yield MeHg −− rather they calculate strongly−bound inorganic Hg. It could be DOC−Hg complexes in addition to MeHg.**

**This group has submitted similar proposals in the past and it appears well funded. It appeared to the panel that the proposed work would not likely contribute significant new scientific contributions.**

**Rating: adequate**

# Technical Review #1

proposal title: Identifying Effects Of Mercury And Selenium On Sacramento Splittail And Striped Bass : An Integrated “Trophic” Approach

## Review Form

### Goals

Are the goals, objectives and hypotheses clearly stated and internally consistent? Is the idea timely and important?

| | |
|---|---|
| **Comments** | **YES; especially w.r.t. Hg and recent article in Jan. 26, 2005 Science.**<br><br>**Hypotheses are clearly spelled out on p. 11 of the pdf.** |
| **Rating** | **excellent** |

### Justification

Is the study justified relative to existing knowledge? Is a conceptual model clearly stated in the proposal and does it explain the underlying basis for the proposed work? Is the selection of research, pilot or demonstration project, or a full−scale implementation project justified?

| | |
|---|---|
| **Comments** | **A qualified statement is made several times that the toxicological significance of methylmercury, selenium, and combined effects on Sacramento splittail and striped bass "are not known in the San Francisco Estuary." Insufficient literature reference is given to convince me that the impacts of either chemical are unknown w.r.t. striped bass, or in other locales. The investigators have obviously done considerable work on Se impacts on splittail. I’m left with the feeling that we haven’t been told everything. Investigators already know that "splittail is more tolerant** |

| | |
|---|---|
| | **to selenium than higher trophic level fish species such as striped bass (Teh et al. 2004a)." What is the new information being gathered here? Were those lethality tests alone? In addition, studies on striped bass are justified based on population declines reported for the mid−1980s. This information is dated. Striped bass populations have climbed back up and, according to Moyle (2002, p. 368) to cite a widely available source, "by 1998, they were estimated to number over 1.3 million, approaching the levels in the 1970s." Does this then remove justification for studying this fish? A thin conceptual model is presented on p. 27 of the pdf. It is so sketchy as to make one think that it was thrown in solely because this is a CALFED requirement. It certainly can't be driving the research plan (alternatively, it makes one wonder why a conceptual model is required for all CALFED proposals when they can be formulated adequately without one).** |
| **Rating** | **good** |

## Approach

Is the approach well designed and appropriate for meeting the objectives of the project? Is the approach feasible? Are results likely to add to the base of knowledge? Is the project likely to generate novel information, methodology, or approaches? Will the information ultimately be useful to decision makers?

| | |
|---|---|
| **Comments** | **Is the approach well designed and appropriate for meeting the objectives of the project?**<br><br>**Methodologies are detailed and SOP.**<br><br>**Is the approach feasible?**<br><br>**Yes.** |

| | |
|---|---|
| | **Are results likely to add to the base of knowledge?**<br><br>**Yes, in a limited, focused way, i.e. specifically for these two species in this one locale. As far as striped bass are concerned, interest in this economically important species is broad, but investigators do not explore this issue.**<br><br>**Is the project likely to generate novel information, methodology, or approaches?**<br><br>**Approach appears fairly routine. Investigators claim that outcome will establish these two species as sentinel species for studies on other toxicants in the Bay. Supporting letter from SFEI, p. 29 of pdf, writer states that "In a separate project funded by CALFED, I and other collaborators are studying striped bass as a sport fish indicator species for mercury in the Delta region." This would seem like duplication of effort in that regard.**<br><br>**Will the information ultimately be useful to decision makers?**<br><br>**Invetigators claim their results " w i l l p r o v i d e s i g n i f i c a n t n e w i n f o r m a t i o n t o C A L F E D M a n a g e r s w i t h r e s p e c t t o t h e t o x i c o l o g i c a l s i g n i f i c a n c e o f S e a n d M e H g e x p o s u r e i n . . . t h e i r d e c i s i o n p r o c e s s f o r a d a p t i v e r e s t o r a t i o n o f t h e B a y" D e l t a S y s t e m" but it is not at all clear how this application would come about. It is already a given that marsh restoration will mobilize or methylate Hg and that splittails eat clams, are a concentrator of toxicants, and are in turn eaten by striped bass. What management decisions can alter these facts?** |
| **Rating** | **good** |

## Feasibility

Is the approach fully documented and technically feasible? What is the likelihood of success? Is the scale of the project consistent with the objectives and within the grasp of authors?

| | |
|---|---|
| **Comments** | **Given the SOP nature of the lab work and straightforward approach used, success seems likely.** |
| **Rating** | **excellent** |

## Monitoring

If applicable, is monitoring appropriately designed (pre−post comparisons; treatment−control comparisons)? Are there plans to interpret monitoring data or otherwise develop information?

| | |
|---|---|
| **Comments** | |
| **Rating** | **not applicable** |

## Products

Are products of value likely from the project? Are contributions to larger data management systems relevant and considered? Are interpretive (or interpretable) outcomes likely from the project?

| | |
|---|---|
| **Comments** | **Information on d i e t a r y a n d t i s s u e r e s i d u e c o n c e n t r a t i o n s , lethal doses, growth impacts, and biomarker effects of the two toxicants will be obtained. If that information is deemed critical to CALFED goals, then products are valuable.** |
| **Rating** | **excellent** |

## Additional Comments

| | |
|---|---|
| **Comments** | **I am decidedly old school when it comes to the mechanics of proposals, but I have been taught (and teach) that the quality of writing that goes into a** |

| | |
|---|---|
| | **proposal reflects the quality of thinking behind the proposal. I haven't read a proposal for any agency with as many typographical errors as this one in years. I recognize that a language barrier exists, but red flags start popping up when I find myself correcting typos instead of reading for content and undoubtedly this biased my emotional reaction to the proposal.**<br><br>**I found myself wondering whether these highly controlled laboratory protocols have application to the field where a host of interactions in terms of water and food chemistry are occurring, i.e. how applicable are the lab findings to the real world? An interaction between Hg and Se could be important, but as soon as we admit those two elements might interact and have additive or synergistic or confounding interactions, we're left to think about all the other chemicals that make up the cocktail of toxins in the Bay, i.e., would Hg ever operate alone or just in combination with Se? Some justification for the focused, laboratory approach should have been given, unless this is just accepted in the field of toxicology.** |

## Capabilities

What is the track record of authors in terms of past performance? Is the project team qualified to efficiently and effectively implement the proposed project? Do they have available the infrastructure and other aspects of support necessary to accomplish the project?

| | |
|---|---|
| **Comments** | **Yes, although the promise of "a minimum of" 5 peer reviewed publications from the proposed work seems slightly inflated given performance from past and current funding.** |
| **Rating** | **excellent** |

## Budget

Is the budget reasonable and adequate for the work proposed?

| | |
|---|---|
| **Comments** | **It appears that most of the budget is salary for P.I. and tech. With all the other grants in operation, is this necessary? My ignorance of how CALFED allocates its funds shows here.** |
| **Rating** | **not applicable** |

## Overall

Provide a brief explanation of your summary rating.

| | |
|---|---|
| **Comments** | **The key question regarding funding of this work is whether CALFED feels it needs to know what levels of Hg, Se, and a combination of the two affect the two fish species given the metrics studied. Does this fit significantly into the Mercury strategy plan for the Bay? If these are important issues, then this is fundable work. If not, then not.**<br><br>**my final rating is actually 3.5, between good and very good.** |
| **Rating** | **good** |

# Technical Review #2

proposal title: Identifying Effects Of Mercury And Selenium On Sacramento Splittail And Striped Bass : An Integrated “Trophic” Approach

## Review Form

### Goals

Are the goals, objectives and hypotheses clearly stated and internally consistent? Is the idea timely and important?

| | |
|---|---|
| **Comments** | **The goals and hypotheses are very clear and consistent. Based on the information within the proposal, the study is timely.** |
| **Rating** | **very good** |

### Justification

Is the study justified relative to existing knowledge? Is a conceptual model clearly stated in the proposal and does it explain the underlying basis for the proposed work? Is the selection of research, pilot or demonstration project, or a full−scale implementation project justified?

| | |
|---|---|
| **Comments** | **The study is justified. The basis for the study is clearly stated and provides ample justification. A pilot study doesn't seem appropriate.** |
| **Rating** | **very good** |

### Approach

Is the approach well designed and appropriate for meeting the objectives of the project? Is the approach feasible? Are results likely to add to the base of knowledge? Is the project likely to generate novel information, methodology, or approaches? Will the information ultimately be useful to decision makers?

| | |
|---|---|
| **Comments** | **The design conforms to conventional ones and will meet the regulatory objectives and knowledge. The study is** |

| | |
|---|---|
| | not novel but information for regulators will be generated. This blending of techniques is becoming conventional. |
| **Rating** | very good |

## Feasibility

Is the approach fully documented and technically feasible? What is the likelihood of success? Is the scale of the project consistent with the objectives and within the grasp of authors?

| | |
|---|---|
| **Comments** | The approach is feasible and clearly documented. The data will be successfully generated. The combination of endpoints and biomarkers will be useful. |
| **Rating** | very good |

## Monitoring

If applicable, is monitoring appropriately designed (pre−post comparisons; treatment−control comparisons)? Are there plans to interpret monitoring data or otherwise develop information?

| | |
|---|---|
| **Comments** | I do not think that this issues is relevant |
| **Rating** | not applicable |

## Products

Are products of value likely from the project? Are contributions to larger data management systems relevant and considered? Are interpretive (or interpretable) outcomes likely from the project?

| | |
|---|---|
| **Comments** | Products or regulaory value will be produced. The information will be useful in conventional interpretations for environmental management. |
| **Rating** | good |

## Additional Comments

| Comments |
|---|

## Capabilities

What is the track record of authors in terms of past performance? Is the project team qualified to efficiently and effectively implement the proposed project? Do they have available the infrastructure and other aspects of support necessary to accomplish the project?

| | |
|---|---|
| **Comments** | **The authors are fully capable of doing this study and generating the promised information.** |
| **Rating** | **excellent** |

## Budget

Is the budget reasonable and adequate for the work proposed?

| | |
|---|---|
| **Comments** | **Yes. The budget seems appropriate.** |
| **Rating** | **very good** |

## Overall

Provide a brief explanation of your summary rating.

| | |
|---|---|
| **Comments** | **The study will provide conventional information useful for management decisions. The scientific/global value will be highest for the biomarker work.** |
| **Rating** | **very good** |